

Claims 1-25

The Official Action cites Scott et al., U.S. patent No. 4,335,388, as anticipating original claims 1-31 of the present application. In particular, the Official Action states that the antenna system shown in figures 17 and 22 of the Scott patent anticipates original claims 1-31 of the present application. In response, claims 1 and 20 have been amended to include subject matter originally recited in claims 13 and 14 to more distinctly point out and claim the differences between the present invention and the system shown in figures 17 and 22 of the Scott patent.

As shown best in figure 22, the Scott patent describes a multi-beam antenna including a power distribution network having successive tiers of variable power dividers and a variable phase shifter associated with each antenna element. Three tiers of variable power dividers are shown in figure 22. Because there are no combining stages in the beam forming network, each antenna element emits an associated beam consisting of a single beam component. These beams are then directed through a waveguide lens 30 to generate a beam pattern exhibiting desired nulls. See Scott at col. 9, lines 25-50. In particular, Scott teaches the use of narrow constituent beams formed by each feed element, which are combined to form shaped beams exhibiting a variety of coverage patterns. See Scott at col. 9, lines 21-24.

The beam forming network described in the present invention, on the other hand, does not employ single-component beams emitted by individual antenna elements or a waveguide lens. Rather, the beam forming network includes an orthogonal beam forming circuit 40, as shown in figure 3 of the present application. This circuit receives two voltage drive signals V1 and V2 and outputs beam driving signals in which each beam includes a component from each voltage drive signal. This configuration causes the antenna array to emit a composite beam that tilts in response to the power division between the voltage drive signals. This is a significantly different beam forming technique that produces lower sidelobes than a single-component beam steered through conventional phase control. This beam forming technique also reduces the number of control devices required to variably tilt the composite beam. See the present application at page 11, line 21 through page 12, line 8.

The variable beam tilting technique described above is not taught or suggested by the Scott patent, which relies on single-component beams emitted by individual antenna elements. Applicant has therefore amended claims 1 and 20 to distinctly point out and claim the distinctive feature of the invention by reciting that "each beam driving signal comprises a component from each voltage drive signal." As a result, the Scott patent, which does not disclose or suggest this feature of the claimed invention, cannot establish a *prima facie* case of obviousness, because each and every element of the claimed invention is not shown or suggested by this reference. MPEP § 2143.03. It should be noted that the claim language added to claim 1 previously appeared in original claims 13 and 14, which have been amended to conform to amended claim 1.

Claims 26-31

The rejection of claims 26-31 based on the Scott patent is respectfully traversed. Original claim 26 states that the power distribution network implements coordinated phase shifting of the beam driving signals delivered to the sub-arrays to cause a desired tilt bias of the range of tilt. In a preferred embodiment, this is accomplished by varying the lengths of the transmission media trace legs to the antenna elements of the sub-arrays using a center pivot method. See the present application at page 16, lines 7-14. This element is not shown or suggested by the Scott patent. In addition, original claim 28 recites that the antenna array is organized into sub-arrays in which the number of antenna elements in the outer sub-arrays is greater than the number of antenna elements in the inner sub-arrays for the purpose of reducing sidelobe emission. Specific embodiments incorporating this design feature are shown in figures 7A and 7B of the present application. Again, this element is not shown or suggested by the Scott patent.

Further, claim 30 recites that the power distribution network implements coordinated phase shifting of the beam driving signals delivered to the elements of one or more sub-arrays to cause a desired blurring of the phase matching of the signals emitted by antenna elements of the outer sub-arrays for the purpose of reducing sidelobe emission. Specific embodiments incorporating this design feature are described at page 13, lines 3-18 and page 20, line 15 through page 22, line 18, line 6. of the present application. Once again, this element is not shown or suggested by the

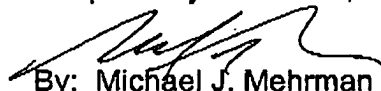
Scott patent. Accordingly, the Scott patent, which does not disclose or suggest the features claims 26-31, as noted above, cannot establish a *prima facie* case of obviousness these claims because each and every element of the claimed invention is not shown or suggested by this reference. MPEP § 2143.03.

CONCLUSION

In summary, the cited reference does not disclose or suggest the invention recited in the claims, as amended. Therefore, the Applicant respectfully submits that the claims are patentable over the cited reference. Applicant notes that the dependent claims have not been specifically addressed in this Response because they were not specifically addressed in the Office Action. Applicant also notes that a number of claims have been amended to correct for grammatical and other technical issues. These amendments are not related to patentability of the claimed, but are entered to correct the form of the claim language. The specification has also been amended to overcome the objection noted in the Official Action. The present application therefore appears to be in condition for allowance.

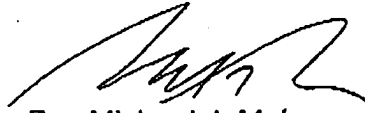
It is believed that the preceding remarks are completely responsive to the First Official Action mailed May 25, 2004, and that the claims are in condition for allowance. If the Examiner believes that there are any issues that can be resolved by a telephone conference, or that there are any informalities that can be corrected by an Examiner's amendment, please call Mike Mehrman at (404) 497-7400.

Respectfully submitted,


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